

REMARKS

I. Introduction

Claims 6-19 and 21-22 are pending in the present application. Claims 12-16 have been amended to correct typographical errors. Claim 18 was amended to recite the structural components of Claim 20. Claim 20 has been canceled. Claims 21 and 22 were amended to correct dependencies. No new matter has been added. In view of the following remarks, it is respectfully submitted that claims 6-19 and 21-22 are allowable and reconsideration is respectfully requested.

II. Rejection of Claims 18-22 Under 35 U.S.C. §112, Second Paragraph

Claims 18-22 were rejected under 35 U.S.C. §112, second paragraph for indefiniteness. The Office Action contends that claim 18 is incomplete since the claim allegedly does not contain structural components or apparatus features claimed therein or in dependent claim 19. The Applicants have amended claim 18 and canceled claim 20. Claim 18 has been amended to incorporate the structural components of claim 20. No new matter has been added.

It has long been recognized that apparatus claims may be written in functional terms. "A patent applicant is free to recite features of an apparatus either structurally or functionally." *In re Schreiber* 128 F.3d 1473, 1478, 44 USPQ2d 1429, 1432 (Fed. Cir. 1997)(citing *In re Swinehart*, 439 F.2d 210, 212 (CCPA 1971)) See also, MPEP §2114 ("features of an apparatus may be recited either structurally or functionally"). Applicants submit that the amended claims are sufficiently definite such that one skilled in the art would understand the metes and bounds of the claims. Therefore, the Applicants respectfully request the withdrawal of this rejection.

III. Rejection of Claims 18-22 Under 35 U.S.C. §102 (e)

Claims 18-22 were also rejected under 35 U.S.C. § 102(e) as anticipated by Ciampi (U.S. Patent No. 6,790,429). It is respectfully submitted that this rejection be withdrawn for at least the following reasons.

To anticipate a claim, the reference must disclose each and every element of the claimed invention. *Nystrom v. Trex Co.* 374 F.3d 1105; 71 USPQ2d 1241 (Fed.

Cir. 2004). Applicants respectfully submit that Ciampi does not disclose, nor even suggest, all of the features recited in amended independent claim 18 or dependent claims 19 and 21-22.

Amended independent claim 18 recites, *inter alia*, an apparatus for the continuous recovery of free tartaric acid containing a stirred heatable tank for mixing the raw materials with water and dissolving potassium hydrogentartrate to form a suspension, and a decanter for decanting the suspension to obtain a clarified liquid. Ciampi describes a device for the continuous synthesis of ferrate by mixing an iron salt and an oxidizing agent in a mixing chamber, a reaction chamber connected to the mixing chamber and adapted to deliver at least a portion of the ferrate to a site of use that is proximal to the reaction chamber. (Column 15, line 58 – Column 16 line 4). Ciampi does not disclose an apparatus for the continuous recovery of free tartaric acid in which, after mixing, the materials form a suspension and said suspension is decanted to form a clarified liquid. Rather, following the mixing of an iron salt and an oxidizing agent, Ciampi discloses a device in which the effluent from the reaction chamber is delivered to a site of use.

Moreover, amended independent claim 18 recites, *inter alia*, an apparatus in which the decanted clarified liquid is further processed by a microfilter to form a microfiltration filtrate, vacuum cooling the microfiltration filtrate with a cooling crystallizer to form potassium hydrogentartrate crystals, centrifuging the potassium hydrogentartrate crystals in a centrifuge, dissolving the potassium hydrogentartrate crystals in water in a heated tank, removing the potassium from the aqueous potassium hydrogentartrate via ion exchange and forming tartaric acid crystals through evaporation in an evaporator. Ciampi states that the ferrate solution produced by the disclosed methods may be somewhat purified or undergo a separation step, and the reference lists a number of acceptable purification methods. (Column 29, lines 24-59). Nowhere does Ciampi disclose the presently claimed apparatus which processes the clarified liquid through a microfilter, followed by a cooling column for vacuum cooling the microfiltration filtrate to form potassium hydrogentartrate (KHT) crystals, a centrifuge for centrifuging the KHT crystals, a heated tank for dissolving the KHT crystals, a cation exchanger for removing the

potassium from the dissolved KHT crystals by ion exchange and an evaporator to form tartaric acid crystals by evaporation.

Because Ciampi fails to disclose all of the features of claim 18, Applicants respectfully submit that this claim is patentable over Ciampi.

As for claims 19 and 21-22, which ultimately depend from claim 18 and therefore include all of the features recited in claim 18, it is respectfully submitted that Ciampi does not render unpatentable these dependent claims for at least the same reasons more fully set forth above in support of claim 18.

Accordingly, Applicants respectfully submit the all rejections under 35 U.S.C. §102 (e) should be withdrawn.

III. Rejection of Claims 6-22 Under 35 U.S.C. §§102 (b) and (d)

Claims 6-22 were rejected under 35 U.S.C. § 102(b) and 102 (d) as anticipated by Australian patent publication 199926019, published 11/11/1999 as patent 749,707 (AU 749,707). It is respectfully submitted that this rejection be withdrawn for at least the following reasons.

To anticipate a claim, the reference must disclose each and every element of the claimed invention. *Nystrom v. Trex Co.* 374 F.3d 1105; 71 USPQ2d 1241 (Fed. Cir. 2004). Moreover for a rejection under 35 U.S.C. 102(d), the reference must involve the same invention. MPEP §§ 706.02(c); 2135. Applicants respectfully submit that AU 749,707 does not disclose, or even suggest, all of the features or involve the same invention recited in independent claims 6 and 18 or any claim depending therefrom.

Claim 6 recites a process for the continuous recovery of free tartaric acid from raw materials containing at least 5.0 wt% potassium hydrogentartrate by mixing the raw materials with water and dissolving potassium hydrogentartrate to form a suspension, decanting the suspension to obtain a clarified liquid, subjecting the clarified liquid to microfiltration to form a filtrate, vacuum cooling the microfiltration filtrate to form potassium hydrogentartrate crystals, and centrifuging the potassium hydrogentartrate crystals.

Contrary to the Examiner's reading, the Applicants respectfully assert that AU 749,707 does not disclose mixing the raw materials with water and dissolving potassium hydrogentartrate to form a suspension. Rather, AU 749,707 discloses a process in which the raw materials are admixed with aqueous potassium hydroxide solution to form dipotassium tartrate (DKT). (Abstract; Points a-b on pages 1-2). The DKT formed in AU 749,707 is mixed with acid to form crystallized potassium hydrogentartrate crystals in suspension. *Id.* In contrast, the presently claimed process separates the dissolved KHT from suspension without a conversion step. The presently claimed invention does not form DKT.

In addition, the Applicants respectfully assert, contrary to the Examiner's reading, that AU 749,707 does not disclose the recited steps of vacuum cooling the microfiltration filtrate to crystallization temperature to form KHT crystals and centrifuging the KHT crystals. AU 749,707 discloses a process in which, after DKT is converted to KHT, the solution is cooled to "low temperatures" to form KHT crystal containing suspension in a precipitation tank before filtering. (Paragraph bridging pages 3-4). In contrast, the presently claimed invention requires vacuum cooling. Nowhere does AU 749,707 disclose or even suggest using cooling under reduced pressures, let alone vacuum cooling.

The Applicants also respectfully contend, contrary to the Examiner's reading, that AU 749,707 does not disclose the claimed process step of centrifuging the KHT crystals. Rather, AU 749,707 discloses a DKT-containing solution which undergoes centrifugation to separate yeast sludge. (Last paragraph at page 2). In contrast, the presently claimed invention centrifuges KHT crystals and not a DKT-containing solution.

Nowhere does AU 749,707 disclose or even suggest a process in which raw materials containing at least 5.0 wt % are admixed with water dissolving the potassium hydrogentartrate to form a suspension, decanting the suspension to obtain a clarified liquid which is subjected to microfiltration, vacuum cooling the microfiltrate to form KHT crystals and centrifuging the potassium hydrogentartrate crystals. Because AU 749,707 fails to disclose many of the features of claim 6, and does not involve the same subject matter, Applicants respectfully submit that these claims are patentable over AU 749,707.

As for claims 7-17, which ultimately depend from claim 6 and therefore include all of the features recited in claim 6, it is respectfully submitted that AU 749,707 does not render unpatentable these dependent claims for at least the same reasons more fully set forth above in support of the patentability of claim 6.

Amended independent claim 18 recites, *inter alia*, an apparatus containing a stirred heatable tank for mixing the raw materials with water and dissolving potassium hydrogentartrate to form a suspension, a decanter for decanting the suspension to obtain a clarified liquid, a microfilter for further processing the decanted clarified liquid to form a microfiltrate, a cooling crystallizer to vacuum cool the microfiltration filtrate to form potassium hydrogentartrate crystals, and a centrifuge for centrifuging the potassium hydrogentartrate crystals.

AU 749,707 discloses a process in which the KHT-containing material is reacted with an aqueous KOH solution to form DKT and filtering the DKT solution. (First full paragraph at page 3). The presently claimed invention does not recite a reaction step with KOH. Moreover, AU 749,707 does not disclose a cooling crystallizer for vacuum cooling, but rather, teaches that after addition of an acid to convert DKT to KHT, the solution is cooled to "low temperatures" to form KHT crystal-containing suspension in a precipitation tank before filtering. (paragraph bridging pages 3-4). The reference also teaches that centrifuges can be used to separate the yeast sludge from the DKT-containing solution. (Last paragraph on page 2). The presently claimed invention does not separate yeast sludge from a DKT solution but rather centrifuges KHT crystals. Nowhere does AU 749,707 disclose an apparatus which mixes the raw materials with water to obtain a suspension, decants the obtained suspension to obtain a clarified liquid, subjects the decanted clarified liquid to microfiltration, vacuum cools the filtrate to form KHT crystals and centrifuges said KHT crystals.

Because AU 749,707 fails to disclose all of the features of the apparatus of claim 18, Applicants respectfully submit that claim 18 is patentable over AU 749,707.

As for claims 19 and 21-22, which ultimately depend from claim 18 and therefore include all of the features recited in claim 18, it is respectfully submitted that AU 749,707 does not render unpatentable these dependent claims for at least

the same reasons more fully set forth above in support of the patentability of claim 18.

IV. Rejection of Claims 6-19 Under 35 U.S.C. §103 (a)

Claims 6-19 were rejected under 35 U.S.C. §103(a) as unpatentable over Falcone (U.S. Patent No. 4,781,809) in view of Collins et al (U.S. Patent No. 6,670,505). It is respectfully submitted that these rejections should be withdrawn for at least the following reasons.

In order for a claim to be rejected for obviousness under 35 U.S.C. § 103(a), not only must the prior art teach or suggest each element of the claim, but the prior art must also suggest combining the elements in the manner contemplated by the claim. See *Northern Telecom, Inc. v. Datapoint Corp.*, 908 F.2d 931, 934 (Fed. Cir. 1990), cert. denied 111 S.Ct. 296 (1990); *In re Bond*, 910 F.2d 831, 834 (Fed. Cir. 1990). The Examiner bears the initial burden of establishing a *prima facie* case of obviousness. See M.P.E.P. §2142. To establish a *prima facie* case of obviousness, the Examiner must show, *inter alia*, that there is some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify or combine the references and that, when so modified or combined, the prior art teaches or suggests all of the claim limitations. See M.P.E.P. §2143.

Independent claim 6 recites a process, *inter alia*, for the continuous recovery of free tartaric acid from raw materials containing at least 5.0 wt% potassium hydrogentartrate by mixing the raw materials with water and dissolving potassium hydrogentartrate to form a suspension, decanting the suspension to obtain a clarified liquid, subjecting the clarified liquid to microfiltration to form a filtrate, vacuum cooling the microfiltration filtrate to form potassium hydrogentartrate crystals, centrifuging the potassium hydrogentartrate crystals, dissolving the potassium hydrogentartrate crystals in water, removing the potassium from the aqueous potassium hydrogentartrate solution by ion-exchange and forming tartaric acid crystals by evaporation.

Falcone teaches forming tartaric acid by precipitating the calcium salts of many food grade acids including tartaric acid, resolubilizing the salt with sulfuric acid

to convert the calcium tartrate back to tartaric acid, followed by concentration and filtration to remove the calcium sulfate, and multiple recrystallization and purification steps which may include ion-exchange. (Column 2 lines 18-30; Column 3 lines 22-30). As acknowledged by the Examiner, Falcone does not disclose microfiltration, centrifuging and evaporating steps for obtaining the tartaric acid. (Office Action at page 5). Moreover, Falcone does not disclose or suggest mixing raw materials containing at least 5 wt % potassium hydrogentartrate in water, and dissolving the potassium hydrogentartrate to form a suspension, decanting the suspension to obtain a clarified liquid to be further processed by separation, and cooling or crystallization steps to form tartaric acid crystals. To the contrary, Falcone teaches away from the claimed process, disclosing that while tartaric acid occurs in the dextrorotatory form as potassium hydrogen tartrate, the classical method for obtaining tartaric acid requires the formation of calcium tartrate. (Column 2, lines 18-23). The process disclosed in Falcone is a multiple step process involving the precipitation of these calcium salts of tartaric acid, not potassium hydrogentartrate, and requiring the resolubilizing of the calcium salts in sulfuric acid.

The Applicants respectfully submit that Collins et al does not cure the deficiencies of the Falcone reference. Collins et al discloses that the "isolation of the desired organic acid(s) by crystallizing the acid from the aqueous phase followed by at least one of filtration, centrifugation, decantation, extraction and/or spray drying." Col.9, lines 52-55 (emphasis added). The presently claimed process does not further process the crystallized acid. Rather, present Claim 6 recites, *inter alia*, a process in which a clarified liquid is subject to microfiltration, the microfiltration filtrate is vacuum cooled to form potassium hydrogentartrate crystals, and centrifuging the potassium hydrogentartrate crystals. Collins et al does not disclose microfiltrating a clarified liquid, vacuum cooling the filtrate to form potassium hydrogentartrate crystals and centrifuging the potassium hydrogen tartrate crystals and further processing the potassium hydrogentartrate crystals to form tartaric acid crystals.

Because Falcone in view of Collins et al. fails to teach or suggest all of the features of claim 6, Applicants respectively submit that this claim is patentable over Falcone in view of Collins et al.

As for claims 7-17, which ultimately depend from claim 6, and therefore, include all of the features recited in claim 6, it is respectfully submitted that Falcone in view of Collins et al does not render unpatentable these dependent claims for at least the same reasons more fully set forth above in support of the patentability of claim 6.

Claim 18 has been amended to incorporate the structural components of dependent claim 20. Dependent claim 20 was not rejected under 35 U.S.C. §103(a) as unpatentable over Falcone (U.S. Patent No. 4,781,809) in view of Collins et al (U.S. Patent No. 6,670,505). Therefore, the Applicants respectfully request the withdrawal of this rejection.

Moreover, amended independent claim 18 recites, *inter alia*, an apparatus containing a stirred heatable tank for mixing the raw materials with water and dissolving potassium hydrogentartrate to form a suspension, a decanter for decanting the suspension to obtain a clarified liquid, a microfilter for further processing decanted clarified liquid to form a microfiltrate, a cooling crystallizer to vacuum cool the microfiltration filtrate to form potassium hydrogentartrate crystals, and a centrifuge for centrifuging the potassium hydrogentartrate crystals.

Falcone teaches a multi-step process involving precipitating calcium salts of many food grade acids including tartaric acid, resolubilizing the salt with sulfuric acid to convert the calcium tartrate back to tartaric acid, followed by concentration and filtration to remove the calcium sulfate, and multiple recrystallization and purification steps which may include ion-exchange. (Column 2 lines 18-30; Column 3 lines 22-30). As acknowledged by the Examiner, Falcone does not disclose microfiltration, centrifuging and evaporating steps for obtaining the tartaric acid. (Office Action at page 5). Falcone also does not disclose or suggest an apparatus comprising a stirred heatable tank for mixing raw materials containing at least 5 wt % potassium hydrogentartrate in water, and dissolving the potassium hydrogentartrate to form a suspension, a decanter for decanting the suspension to obtain a clarified liquid to be further processed by a microfilter, a cooling crystallizer, a centrifuge, a heated tank a cation exchanger, and an evaporator to form tartaric acid crystals. To the contrary, Falcone teaches away from the claimed apparatus, disclosing that while tartaric acid occurs in the dextrorotatory form as potassium hydrogen tartrate, the classical method

for obtaining tartaric acid requires the formation of calcium tartrate. (Column 2, lines 18-23). The process disclosed in Falcone is a multiple step process involving the precipitation of these calcium salts of tartaric acid, not potassium hydrogentartrate, and requiring the resolubilizing of the calcium salts in sulfuric acid.

The Applicants respectfully submit that Collins et al does not cure the deficiencies of the Falcone reference. Collins et al discloses that the "isolation of the desired organic acid(s) by crystallizing the acid from the aqueous phase followed by at least one of filtration, centrifugation, decantation, extraction and/or spray drying." Col.9, lines 52-55 (emphasis added). The presently claimed apparatus does not further process the crystallized acid. Rather, present Claim 18 recites, *inter alia*, an apparatus in which a clarified liquid is subject to microfiltration, the microfiltration filtrate is vacuum cooled to form potassium hydrogentartrate crystals, and centrifuging the potassium hydrogentartrate crystals. Collins et al does not disclose an apparatus comprising microfilter for microfiltrating a clarified liquid, a cooling crystallizer for vacuum cooling the filtrate to form potassium hydrogentartrate crystals and a centrifuge for centrifuging the potassium hydrogen tartrate crystals and further processing the potassium hydrogentartrate crystals to form tartaric acid crystals.

As for claim 19, which depends from claim 18, and therefore, include all of the features recited in claim 18, it is respectfully submitted that Falcone in view of Collins et al does not render unpatentable this dependent claim for at least the same reasons more fully set forth above in support of the patentability of claim 18.

Accordingly, Applicants respectively submit that all rejections raised under 35 U.S.C. §103(a) should be withdrawn.

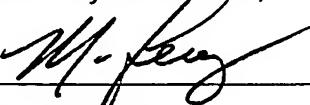
V. **Conclusion**

In light of the foregoing, Applicants respectfully submit that all pending claims are in condition for allowance. Prompt reconsideration and allowance of the present application are therefore earnestly solicited.

Respectfully submitted,

Dated:

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